

Question #43

Answer: D

Use “age” subscripts for years completed in program. E.g., p_0 applies to a person newly hired (“age” 0).

Let decrement 1 = fail, 2 = resign, 3 = other.

$$\begin{aligned}\text{Then } q_0^{(1)} &= 1/4, q_1^{(1)} = 1/5, q_2^{(1)} = 1/3 \\ q_0^{(2)} &= 1/5, q_1^{(2)} = 1/3, q_2^{(2)} = 1/8 \\ q_0^{(3)} &= 1/10, q_1^{(3)} = 1/9, q_2^{(3)} = 1/4\end{aligned}$$

$$\text{This gives } p_0^{(\tau)} = (1 - 1/4)(1 - 1/5)(1 - 1/10) = 0.54$$

$$p_1^{(\tau)} = (1 - 1/5)(1 - 1/3)(1 - 1/9) = 0.474$$

$$p_2^{(\tau)} = (1 - 1/3)(1 - 1/8)(1 - 1/4) = 0.438$$

$$\text{So } 1_0^{(\tau)} = 200, 1_1^{(\tau)} = 200(0.54) = 108, \text{ and } 1_2^{(\tau)} = 108(0.474) = 51.2$$

$$q_2^{(1)} = \left[\log p_2^{(1)} / \log p_2^{(\tau)} \right] q_2^{(\tau)}$$

$$q_2^{(1)} = \left[\log\left(\frac{2}{3}\right) / \log(0.438) \right] [1 - 0.438]$$

$$= (0.405 / 0.826)(0.562)$$

$$= 0.276$$

$$d_2^{(1)} = l_2^{(\tau)} q_2^{(1)}$$

$$= (51.2)(0.276) = 14$$